



## Short report

# The handling of bariatric bodies

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## ABSTRACT

Increased body mass has occurred in many countries over the past two decades. Morbidly obese individuals are prone to higher rates of cardiovascular, endocrine and malignant disease requiring hospitalization and medical care. A review of problems encountered by ambulance services, hospitals, forensic facilities and funeral service reveals common problems in examination, transport and handling. Strategies used in one area of health to deal with bariatric cases can be adapted for use in other areas. Forensic facilities may require the use bigger body bags, reinforced trolleys and vehicles, with larger refrigerator bays and CT scanning machines. The best option is for purpose built mortuaries designed with lifting hoists and passages, doorways, machinery and autopsy tables that can cope with morbidly obese bodies. Unnecessary handling and lifting of these bodies should be minimized, and so the admissions area, cool room storage and dissection theatre should be in close proximity to each other.

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## 1. Introduction

Significant increases in body weight and in body mass index (BMI: calculated as the weight in kilograms divided by height in metres) have been demonstrated in a large number of countries over the past two decades.<sup>1</sup> The increases in body size and mass have caused considerable problems in health care and allied areas, including forensic facilities. For example, the percentage of morbidly obese individuals (BMI > 40) undergoing forensic autopsies in South Australia rose from 1.3 to 4.8% over the two decades from 1986 to 2006.<sup>2</sup> The following short report details handling issues (with possible solutions) that have been encountered based on our experiences in South Australia, from the time of initial assessment and transport of a patient to hospital, to transfer of the body to the forensic mortuary and ultimately burial (Table 1). Certain techniques used by ambulance and hospital personnel may be directly transferable to forensic facilities.

## 2. Discussion

“Bariatrics” is the area of medicine that is involved with the prevention and treatment of obesity and its associated diseases. A

wide range of services and medical personnel have been directly affected by bariatric patients including ambulance officers, hospital doctors, nurses and ancillary staff, nursing home employees, mortuary staff, and funeral and cemetery employees.

### 2.1. Ambulance services

On occasion attending ambulance personnel have been unable to remove morbidly obese individuals from their homes due to a combination of excessive weight and size. Rarely doorways and/or windows have had to be dismantled to enable winching of ill morbidly obese individuals into transport vehicles. This may necessitate collaboration with fire departments and civil emergency organizations.

In South Australia the local ambulance service has deployed two vehicles for obese patients. The primary vehicle with a crew of two is the designated transport vehicle with the second vehicle having a crew of two to assist with lifting. Patients are moved using a commercial airbed that functions like a small hovercraft (Hovermatt®). It has a series of holes and is connected to an air pump that fills the airbed and forces air out through the holes. The unit is used in conjunction with plastic sheeting, to provide better lift on carpeted surfaces, and a segmented airbed that inflates in stages to raise the patient from floor to bed or stretcher/trolley height. This system minimises the risk of injury to personnel moving obese individuals and could equally be used in the conveyancing of bodies to forensic facilities. Some military and emergency services personnel use lightweight plastic sleds, such as the Med Sled®

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**Table 1**

Sequential problems that may arise in morbidly obese individuals – from medical treatment for serious illness to burial.

Initial assessment	
Difficult evaluating in home environment	
Transport to hospital	
Problems in removal from house	
Problems in transport	
Medical evaluation	
Difficulty with examination	
Difficulty in performing diagnostic/imaging tests	
Hospitalization	
Prolonged hospitalization	
Increased rates of infection/surgical complications	
Increased morbidity/mortality	
Increased incidence of many diseases	
Forensic issues	
Difficulty examining at the death scene	
Enhanced putrefaction	
Difficulty storing/moving body	
Difficulty performing autopsy	
Funeral/burial issues	
Larger coffins/graves required	
Cremation may not be possible	

Rescue which is rated to 455 kg, to lift or manoeuvre bodies down hallways and stairs.

Recently another larger vehicle has been purchased with a hydraulic lifting device at the rear to facilitate "heavy" patient transfers. This enables carriage of individuals with weights of up to 500 kg by a crew of only two.

## 2.2. Hospitals

Morbidly obese patients cost the health care system millions of dollars a year with their increased incidence of disease,<sup>3</sup> and requirements for specialized equipment such as supersized beds, toilets and hoists. Many hospitals have had to update their manual handling procedures to accommodate bariatric patients. In addition, obese and morbidly obese individuals stay longer in hospital, due in part to their increased susceptibility to nosocomial infections and higher rate of surgical complications.

In certain South Australian hospitals weight is considered part of the patient risk assessment, with attention being drawn to the fact that normal equipment such as chairs and commodes generally have a safe working capacity of only 120 Kg. For heavier patients alternative strategies for appropriate management are required, including specialized bedding, bariatric electrically operated recliner chairs, larger showers, commodes, wheelchairs, walking frames and electric lifters. Transfer to other hospital wards requires considerable consultation.

Other issues to consider involve the use of special equipment and clothing such as larger blood pressure cuffs, anti-embolic stockings, and larger sized gowns and linen. Difficulties with diagnostic testing range from problems with venepuncture, to an inability to use standard size imaging equipment.<sup>4</sup> Door sizes may need to be modified, in addition to using larger reinforced trolleys and beds. There also needs to be an increase in the nurse/patient ratio with special training in manual handling. Special emergency/evacuation procedures need to be formulated.

## 2.3. Nursing homes

Many nursing homes have an upper weight limit for admission, with morbidly obese patients being refused admission because of risks to staff.

## 2.4. Forensic services

Many of the issues described above are also encountered in the handling of bodies that are the subject of forensic investigations. However, difficulties at death scenes not only involve the movement and transport of bodies, but also the appropriate examination and assessment of the decedent for evidence of injuries. Given the difficulties in moving and positioning morbidly obese individuals this may simply not be possible. Transport to the mortuary may require the use larger reinforced trolleys and vehicles. Storage of such bodies may also not be possible in standard refrigerator bays and preliminary CT scanning using machines designed for individuals with normal BMI's may not be feasible. Larger body bags will be required. The best option is for purpose built mortuaries that have been designed with lifting hoists, passages and doorways, machinery and autopsy tables that can cope with bodies with BMI's > 40 and weights > 300 kg.<sup>5</sup> Mortuary supply companies also sell manual handling items that may be useful in moving bariatric bodies such as plastic slides, heavy duty lifting straps and reinforced back boards.

Specific steps that can be taken to facilitate the autopsy examination of the morbidly obese involve:

- Improved mechanical lifters – many facilities have a reinforced, heavy duty ceiling mounted lifting device to enable lifting from a funeral director's stretcher to a mortuary body tray on admission.<sup>6</sup> This will also facilitate examination of the back of the deceased.
- Docking stations – the use of stainless steel trays on a base trolley that is docked into a dissection area for post mortem examination eliminates the need to transfer bodies from trolleys onto fixed autopsy tables.
- Adjustable height tables – a problem often exists for the pathologist and technicians to gain access to body cavities. While an elevated platform may be used this is less preferable than having a heavy duty mobile table with an adjustable height.
- Wider body trays – This eliminates the necessity of having to place a body on two adjacent trolleys to accommodate the width and spread once the body cavities have been opened.
- Mortuary design – any refurbishment or new construction should take into account the handling of bariatric bodies. Unnecessary handling and lifting of these bodies should be minimized and so the admissions area, cool room storage and dissection theatre should be in close proximity to each other. Much can be learnt from veterinary theatres that specialise in large animal dissections.

## 2.5. Funeral industry

While many funeral directors simply call upon more staff to assist with removal of a decedent from a house or hospital this is often difficult and sometimes dangerous, potentially leading to spinal or muscular injuries. The traditional two person "lift and carry" method that fire departments use is not practical and sometimes mechanical devices cannot be used in narrow passages or on staircases. The use of larger funeral vans with mechanical hoists is occurring more often.

Additional steps that have been taken by the funeral industry involve the use of over- or double sized coffins, and the digging of larger graves at cemeteries for burial. In New Zealand standard coffins have been increased in width at the level of the shoulders from 48 to 58 cm. Families may have to purchase a double size burial plot. Special arrangements will also have to be made with crematoriums to ensure that coffins can fit through crematoria

doors.<sup>7</sup> In South Australia the size of incinerator doors ranges in width from 750 mm to 860 mm, with a standard height of 930 mm, in three crematoria that were contacted. The temperatures used also have to be modified as the excessive fat acts as extra fuel and can rapidly escalate the chamber's internal temperature. On occasion cremation is may simply not be an option in the massively oversized.

### 3. Conclusion

The obesity epidemic is affecting a wide range of health care providers involved with patient or body handling.<sup>8</sup> While a number of appliances are available for assisting with heavy lifting, these can only reduce, but not eliminate, the risk of harm to staff. Managers of forensic mortuaries need to provide a safe working environment for staff, undertake regular risk assessments, and introduce new procedures and techniques to deal with the "heavy lifting" hazard. Regular staff training on specific bariatric issues should be undertaken and structural alterations to mortuaries may need to be made.

#### Conflict of interest

None.

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#### Ethical approval

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